

AMENDMENT TO THE CLAIMS:

1. (Currently Amended) An osteoimplant consisting essentially of which comprises a solid aggregate of bone-derived elements selected from the group consisting of superficially demineralized bone-derived elements, substantially completely demineralized bone-derived elements and mixtures thereof, adjacent bone-derived elements being bonded to each other through covalent chemical linkages between their surface-exposed collagen formed by chemical crosslinking agent, provided, that where substantially all of the bone-derived elements are substantially completely demineralized bone-derived elements the osteoimplant contains at least one additional component selected from the group consisting of reinforcing particles and fillers, and wherein the solid aggregate of bone-derived elements possesses a compression strength of from about 10 to about 200 MPa.
2. (Currently Amended) The osteoimplant of Claim 1 wherein substantially all of the superficially demineralized bone-derived elements are superficially demineralized particles, strips or sheets of allogenic, xenogenic cortical or cancellous bone.
3. (Currently Amended) The osteoimplant of Claim 1 wherein substantially all of the bone-derived elements are substantially completely demineralized particles, strips or sheets of allogenic, xenogenic cortical or cancellous bone, the reinforcing particles being selected from the group consisting of fully mineralized bone, graphite and pyrolytic carbon containing at least one additional component selected from the group consisting of reinforcing particles and filler.

4. (Currently Amended) The osteoimplant of Claim 1 wherein ~~substantially all of the bone-derived elements are substantially completely demineralized particles, strips or sheets of allogenic, xenogenic cortical or cancellous bone; the reinforcing particles are selected from the group consisting of fully mineralized bone, graphite, pyrolytic carbon and mixtures thereof, and the filler is being selected from the group consisting of hydroxyapatite, tricalcium phosphate, other calcium salts, bioglass, bioceramic, bioabsorbable polymer, nonbioabsorbable material and mixtures thereof.~~

5. (Previously presented) The osteoimplant of Claim 1 containing an additional component selected from the group consisting of bone-growth inducing substance, growth factors, cellular material, genetic material, calcification-controlling agent and hydration agent.

6. (Original) The osteoimplant of Claim 1 possessing a cross section for at least a portion of its length which is, or approximates, a circle, oval or polygon, the implant optionally possessing a cavity for at least a portion of its length.

7. (Cancelled).

8. (Cancelled).

9. (Original) The osteoimplant of Claim 1 possessing a hydration-facilitating agent.

10. (Previously presented) The osteoimplant of Claim 9 wherein the hydration-facilitating agent is glycerol.

11. (Currently Amended) The osteoimplant of Claim 1 wherein the chemical linkages are formed by exposing the superficially demineralized bone-derived elements to a chemical crosslinking agent.

12. (Original) The osteoimplant of Claim 11 wherein the chemical crosslinking agent is selected from the group consisting of monoaldehydes, dialdehydes, polyepoxy compounds, polyvalent metallic oxides, organic tannins, phenolic oxides derived from plants, hydrazide, dicyclohexyl carbodiimide, hexamethylene diisocyanate, sugars and enzymes.

13. (Currently Amended) The osteoimplant of Claim 11 wherein the superficially demineralized bone-derived elements are exposed to the chemical crosslinking agent by placing thesaid bone-derived elements in a solution of chemical crosslinking agent.

14. (Currently Amended) The osteoimplant of Claim 11 wherein the superficially demineralized bone-derived elements are exposed to the chemical crosslinking agent by exposing thesaid bone-derived elements to vapors of the chemical crosslinking agent.

15. (Original) The osteoimplant of Claim 11 wherein the chemical crosslinking agent is a polyepoxy compound.

16. (Original) The osteoimplant of Claim 11 wherein the chemical crosslinking agent is a monoaldehyde or dialdehyde.

17. (Original) The osteoimplant of Claim 11 wherein the chemical crosslinking agent is formalin.

18. (Original) The osteoimplant of Claim 11 wherein the chemical crosslinking agent is polyethylene glycol diglycidyl ether.

19. (Cancelled).

20. (Cancelled).

21. (Previously presented) The osteoimplant of Claim 11 containing an additional component selected from the group consisting of bone-growth inducing substances, growth factors, adhesives, plasticizers, flexibilizing agents, cellular material, genetic material, calcification-controlling agents, hydration facilitating agents, biostatic agents, biocidal agents, polymers, inorganic compounds, substances imparting radiopacity and metallic meshes.

Claim 22 (Cancelled)

23. (Cancelled).

24. (Currently Amended) The osteoimplant of Claim 11 wherein the bone-derived elements are superficially demineralized ~~or substantially fully demineralized~~ sheets obtained by longitudinally slicing the diaphyseal region of whole cortical bone.

25. (Original) The osteoimplant of Claim 24 wherein each sheet is approximately 1.5 mm thick.

26. (Original) The osteoimplant of Claim 24 wherein the sheets are assembled into a layered structure prior to exposing the sheets to a chemical crosslinking agent.

27. (Cancelled).

28. (Cancelled).

29. (Cancelled).

30. (Original) The osteoimplant of Claim 26 possessing a total thickness of from about 2 to about 20 mm.

31. (Original) The osteoimplant of Claim 24 configured and dimensioned as a square or rectangle.

32. (Original) The osteoimplant of Claim 24 configured and dimensioned as a cylinder.

33. (Previously presented) The osteoimplant of Claim 24 configured and dimensioned as an intervertebral insert, a long bone, a cranial bone, a bone of the pelvis, a bone of the hand, a bone of the foot or section of any of the foregoing.

34. (Original) The osteoimplant of Claim 11 wherein the solid aggregate of bone-derived elements possesses a network of pores, perforations, apertures, channels, or spaces.

35. (Previously presented) The osteoimplant of Claim 34 having incorporated therein one or more bone growth inducing or bone healing substances.

Claims 36-144 (Cancelled).